REMARKS

Claims 1-20 are pending in the application.

Claim 5 is objected for missing a period at the end of claim. Claim 5 is amended to correct the same, and withdrawal of the objection to claim 5 is respectfully requested.

Claims 1, 2, 6, 9-12, 16, 19 and 20 are rejected under 35 USC 102(e) as being anticipated by Gaston (US Patent No. 6,546,297).

Claims 3-5, 7, 8, 13-15, 17 and 18 are rejected under 35 USC 103(a) as being unpatentable over Gaston and further in view of Harel ("STATEMATE: A Working Environment for the Development of Complex Reactive Systems," Proceedings of the 10th International Conference on Software Engineering, pages 396-406, 1998).

Independent claims 1 and 11 are amended. Thus, claims 1-20 remain pending for reconsideration, which is respectfully requested.

No new matter has been added in this Amendment. The foregoing rejections are hereby traversed.

SPECIFICATION

(1)   The specification is objected to because of informalities, and in page 2, item 6, of the Office Action, the Examiner requires a Substitute Specification in compliance with 37 CFR 1.52(a) and (b).

However, regarding the objection to the specification and the substitute specification requirements, 37 CFR 1.125(a) provides that a substitute specification might be required "[i]f the number or nature of the amendments or the legibility of the application papers renders it difficult to consider the application ..." Upon reviewing the specification, it is respectfully asserted that the specification uses proper idiomatic English sentences and the specification is not difficult to consider, and the specification only has a few minor possible grammatical errors that do not render the application difficult to consider.

Therefore, according to the foregoing, the specification has been amended to correct these few grammatical errors, as pointed out by the examiner as well as others. Therefore, a substitute specification requirement is not appropriate, and withdrawal of the specification objection in view of the remarks and the specification amendments is respectfully requested.

(2)   In page 2, item 7, of the Office Action, the Examiner requests identifying version

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numbers for technology disclosed in the StateFlow manual, StateMate manual, ZIPC manual and Softune manual, discussed in page 55, lines 3-10 of the specification. However, one skilled in the art would know what version numbers of such technologies can or should be used according to the claimed present invention. In particular, the claimed present invention is directed to a support system for supporting development of embedded software to control a mechanism, in which the support system can use state-transition diagram or table creating/editing technology. Therefore, withdrawal of the objection to the specification is respectfully requested.

CLAIM REJECTIONS – 35 U.S.C. §102 AND §103

Claims 1, 2, 6, 9-12, 16, 19 and 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Gaston.

Claims 3-5, 7, 8, 13-15, 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gaston as applied to claims 1 and 11, and further in view of Harel.

The independent claims of the present Application are 1 and 11, regarding which the Examiner, in the Office Action, relies on Gaston FIG. 20 and FIGS. 1, 2 and 3, and asserts:

(a) that the mechanism designing section of the claimed present invention is equivalent to operation 2015 ("Build control panel by placing components") of FIG. 20 of Gaston, and is described in column 2, lines 44-52;

(b) that the three-dimensional mechanism model simulating section of the claimed present invention is equivalent to operation 2030 ("Test device") of FIG. 20 of Gaston;

(c) that the embedded software developing section of the claimed present invention is equivalent to element 2020 ("Develop software by selecting and associating processes") of FIG. 20 of Gaston, and is described in column 5, lines 43 and 44;

(d) that the first interface section of the claimed present invention is described in column 6, lines 16-19 of Gaston, which discloses with reference to FIGS. 1 and 3, the interface module 165 between the computer 108 and the active components 130 of the target device (appliance) 120; and

(e) that the second interface section of the claimed present invention is described from column 4, line 62 through column 5, line 2, which discloses with reference to FIG. 3, the control panel 200 of the target device (appliance) 120, the control panel 200 providing the interface between the appliance 120 and an appliance operator.

However, Gaston, with reference to FIGS. 1 and 3, discloses a design system 100 that uses a design tool 105 running on a computer 110 along with a set of standard hardware control modules 115, to simplify design and development of controls for a device 120, such as an appliance. Gaston, with reference to FIGS. 1 and 3, discloses, "Initially, a prototype [a control software] is designed using only the design tool 105 and the computer 110 (step 305). Next the **prototype is tested and debugged using an interface module 165 connected between the computer 110 and the active components 130 of the appliance** (step 310). Essentially, **the interface module** is a single hardware device that **implements all variations of the set of standard hardware control modules 115**. ... The tool 105 provides a virtual control panel that is displayed on a display 170 of the computer and permits the computer 110 to operate the interface module, which, in turn, **operates the active components 130 of the appliance**" (column 6, lines 13-28). Therefore, in Gaston, as shown in FIG. 1, the software tool 105 and the interface module 165, control the actual physical components of an appliance. Therefore, in Gaston, to test and debug the control software, an actual device is needed. In contrast to Gaston, according to the claimed present invention, **designing of a mechanism** is performed **concurrently with development of embedded software** for controlling the mechanism, **while the simulation of the mechanizing is being performed**, and the independent claims 1 and 11 are amended for clarity accordingly.

More particularly:

Referring to operation 2015 ("Build control panel by placing components") of FIG. 20 [item (a) of the above] (see column 16, lines 31-34) and to the description in column 2, lines 44 and 45, it is disclosed in Gaston that a computer is used to develop a control panel by selecting and placing software representations of the control panel.

Referring to element 2030 ("Test device") of FIG. 20 [item (b) of the above)] (see column 16, lines 41-43), it is disclosed in Gaston that a manufactured device is tested using the control software running on the control hardware and under the control of the computer 110.

Referring to element 2020 ("Develop software by selecting and associating processes") of FIG. 20 [item (c) of the above] (see column 16, lines 34-38) and to the description in column 5, lines 43 and 44, it is disclosed in Gaston that the computer 110 is also used to develop control software for the device by selecting software representations of pre-existing control processes and associating the selected control processes with the selected control panel objects.

Referring to the description of column 6, lines 16-19 and FIGS. 1 and 3 [item (d) of the above], it is disclosed in Gaston that the prototype is tested and debugged using an interface module 165 connected between the computer 110 and the active components 130 of the appliance (device) 120.

Referring to the description from column 4, line 62 through column 5, line 2 and FIG. 2 [item (e) of the above], it is disclosed in Gaston that the control panel 200 provides the interface between the appliance (device) 120 and the appliance operator.

However, according to the foregoing Gaston disclosures, Gaston discloses only the prior art and does not disclose or suggest the claimed present invention, as follows: Gaston's interface module 165 in column 6, lines 16-19 [in item (d) of the above], which the Examiner suggests as being equivalent to the "first interface section" of the claimed present invention, is "connected between the computer 110 and the *active components 130 of the appliance.*" This makes it clear that Gaston only discloses an art equivalent to the prior art of the claimed present invention, because in contrast to Gaston, the claimed present invention, with reference to FIG. 1 of the present Application, provides "*a first interface*" 50 *between* "a *mechanism designing section for three-dimensionally designing a mechanism*" 20 and "a *three-dimensional-mechanism model simulating section*" 30, and "*a second interface*" 51, 52, between the "*three-dimensional-mechanism model simulating section*" 30 and "*embedded software developing section*" 40. In contrast to Gaston and Harel, The "second interface" 51 and 52 of the claimed present invention provide, "a second interface section for *transferring data between* said three-dimensional-mechanism model simulating section and said embedded software developing section *while synchronizing* said three-dimensional-mechanism model simulating section and said embedded software developing section in operation with each other."

In other words, contrary to the Examiner's suggestion that Gaston's operations 310, 315, and 2030, disclose the claimed present invention's "three-dimensional-mechanism model simulating section" 30, these Gaston operations are testing operations against the actual target device 120, as clearly disclosed in FIGS. 1 and 3 of Gaston. For example, as relied upon by the Examiner in column 6, lines 16-19 [in item (d) of the above], Gaston's interface module 165 is "connected between the computer 110 and the *active components 130 of the appliance.*" So that in Gaston's FIGS. 1 and 3, the computer 110 via the software tool 105 is not simulating control of the target device 120, but directly interfacing, via the interface module 165, with the active components 130 of the target device 120.

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Here, let us refer to the flow of FIG. 20 of Gaston. After software representations of pre-existing control panel components and also control processes are stored on computer (steps 2005 and 2010), the computer is used to develop a control panel for the device by selecting and placing software representations of the control panel (step 2015). The computer is also used to develop control software for the device by selecting software representations of pre-existing control processes and associating the selected control processes with the selected control panel objects (step 2020). The control software is downloaded from the computer to control the hardware (*actual hardware*) to be included in the device (step 2025). The device is tested using the control software running on the control hardware and under the control of the computer (2030).

The above item (b) (i.e., Gaston's operations 310, 315, and 2030), which the Examiner alleges is equivalent to the "three-dimensional mechanism model simulating section" 30 of the claimed present invention, only discloses a manufacturing testing of the actual device, and does not disclose or suggest *simulation*. That is, Gaston thus does not disclose anything about the simulation performed by the three-dimensional mechanism model simulating unit of the claimed present invention.

Further, Gaston also does not disclose or suggest anything about one of the benefits of the claimed present invention, which makes it possible to design a mechanism concurrently with development of embedded software for controlling the mechanism, by *interfacing (i.e., interfaces 50, 51, and 52) a mechanism designing section 20, a 3D simulator 30, and an embedded software development section 40*, as shown, for example, in FIG. 1 of the present Application. To clarify that in the claimed present invention, designing of a mechanism is performed concurrently with development of embedded software for controlling the mechanism, while the simulation of the mechanizing is being performed, independent claims 1 and 11 are amended.

In contrast to Gaston and Harel, the claimed present invention as recited in independent claims 1 and 11, using claim 1 as an example, provides:

1.   (Currently Amended) A support system comprising:

a mechanism designing section for three-dimensionally designing a mechanism composed of a plurality of parts including an actuator and a sensor;

a *three-dimensional-mechanism model simulating section*, in which the mechanism is structured as a three-dimensional-mechanism model, for simulating an operation of the mechanism;

an embedded software developing section for developing a control program, which is embedded in the mechanism to control the operation of the mechanism, as embedded software;

a *first interface section* for inputting designing data, which is created in said mechanism designing section as the result of the designing by said mechanism designing section, *from said mechanism designing section to said three-dimensional-mechanism model simulating section to be reflected on the three-dimensional-mechanism model*; ~~and~~

a *second interface section* for transferring data *between said three-dimensional-mechanism model simulating section and said embedded software developing section while synchronizing* said three-dimensional-mechanism model simulating section and said embedded software developing section in operation with each other; and

said second interface section interfacing between said three-dimensional-mechanism model simulating section and said embedded software developing section, while design data produced by said mechanism designing section is reflected, as required, in the three-dimensional-mechanism model, which is structured by said three-dimensional-mechanism model simulating section, through said first interface unit, so that designing of the mechanism and development of the embedded software is concurrently performed (emphasis added).

Accordingly, the subject matters of claims 1, 2, 6, 9-12, 16, 19, and 20 are not disclosed or suggested in Gaston. Further, the subject matters of dependent claims 3-5, 7, 8, 13-15, 17, and 18, are also not easily conceivable to the ordinarily skilled in the art, over Gaston, which only discloses a prior art of the claimed present invention, even in view of Harel.

In view of the remarks and the claim amendments, withdrawal of the rejections of pending claims and allowance of pending claims is respectfully requested.

CONCLUSION

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

Respectfully submitted,
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